2003.[4] These results showed a measured C/N of 15.9 dB in the presence of a weak signal level. This is within 0.7 dB of the planning factor figure and indicates that the latest generation of DTV receivers will perform in line with those of earlier manufacture.

3.5 Antenna Orientation

The DTV planning factors assume that the receiving antenna is properly oriented toward the desired station. In the SHVIA proceeding, the Commission affirmed the validity of this assumption with respect to reception of an analog TV signal. Channel Master (now owned by Andrew), Winegard and Delhi (formerly Jerrold) all manufacture antenna rotators for outdoor mast-mounted home antennas. All have control systems that may be operated inside the home to remotely actuate the rotator. The same assumption of proper antenna orientation, as affirmed in the SHVIA proceeding, is also valid for reception of DTV signals, and is therefore consistent with the DTV planning factors.

4. Other DTV Receiver Performance Factors

The NOI requests information on DTV receiver performance as it may be affected by conditions not addressed by the planning factors. Among these conditions is performance in the presence of multipath. With regard to multipath conditions, we note that recent studies on "fifth generation", 8-VSB receivers have shown significant improvement over the performance of earlier receivers.[5]

In Laud's paper, he reports laboratory tests demonstrating fifth generation receiver equalizer capability to handle up to 50-µs pre- and post-ghosts. He also indicates significant improvement in ghost-canceling capability of fifth generation receiver equalizers, with a capable of handling ghost ensembles with up to 100 percent ghosts. His paper also reports on field tests on fifth-generation receivers in Washington, DC; Ottawa, Canada; and Baltimore, MD where significant improvement in performance of fifth generation receivers at known "difficult" locations was demonstrated. In these field tests, fifth generation receivers showed improvements ranging from an elimination to near elimination of failures (in the Ottawa and Baltimore tests) to a reduction in failures by a factor of three (in the Washington tests).

[4] See "Results of the Laboratory Evaluation of Zenith 5th Generation VSB Television Receiver for Terrestrial Broadcasting", Report Version 1.1, Communications Reseach Centre Canada, September 2003.
[5] See Tim Laud, et. al., "Performance of 5th Generation 8-VSB Receivers", IEEE Transactions of Consumer Electronics, Vol. 50, No. 4, Nov. 2004. Also Yiyan Wu, et. al., "An ATSC DTV Receiver With Improved Robustness to Multipath and Distributed Transmission Environments", IEEE Transactions on Broadcasting, Vol. 50, No. 1, March 2004.

5. Conclusion

In light of the foregoing information on performance of DTV reception equipment, we conclude that equipment is available that will permit DTV reception in the presence of a signal equaling or exceeding that based on the DTV planning factors. Therefore, use of the DTV noise-limited signal strengths, developed based on those planning factors and contained in the DTV Sixth R&O, is an appropriate metric for predicting DTV service under the terms of the SHVERA.

This statement was prepared by me or under my direction and it is true and correct to the best of my knowledge and belief.

Louis Robert du Treil, Jr., P.E.

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201 Fletcher Ave.
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June 17, 2005

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Technical Standards for Determining Eligibility	)	
For Satellite-Delivered Network Signals Pursuant	)	ET Docket No. 05-182
To the Satellite Home Viewer Extension and	)	
Reauthorization Act	)	
	)	

To: Office of the Secretary
Attn: The Commission

COMMENTS OF ATI TECHNOLOGIES, INC.

ATI Technologies, Inc. ("ATI"), by its attorneys, hereby submits these Comments in response to the Commission's *Notice of Inquiry* in the above-captioned proceeding.[1] In the NOI, the Commission requested comment on a number of issues related to the determination of eligibility to receive distant broadcast digital television ("DTV") signals from direct-to-home satellite operators. As the industry leader in the design and production of DTV receiver chips, ATI respectfully submits these Comments to provide the Commission with timely and accurate information about the performance of DTV receivers and associated equipment that now is or soon will be available to end-user consumers.

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1 Technical Standards for Determining Eligibility For Satellite-Delivered Network Signals Pursuant to the Satellite Home Viewer Extension and Reauthorization Act, ET Docket No. 05-182, *Notice of Inquiry*, FCC 05-94 (rel. May 3, 2005) ("*NOI*").

Introduction

Founded in Toronto, Canada in 1985, ATI designs, produces and markets graphics, video, and multimedia processors for use in personal computers including both PCs and Macs; video game consoles such as the X-Box; and consumer electronics devices, including mobile phones, personal digital assistants, and DTV receivers and set-top boxes ("STBs"). In 2004, when ATI garnered US $2 billion in revenue, NASDAQ added ATI to its NASDAQ-100 Index.[2]

In 2004, ATI shipped more than five million DTV chips for use in high definition televisions and STBs. ATI supplies leading manufacturers of HD TVs and HD STBs including but not limited to Funai, Hitachi, JVC, Mitsubishi, Matsushita (Panasonic), Philips, Scientific-Atlanta, Samsung, Sharp, Sony, TiVo, Toshiba, Thomson, TTE (RCA), and others. ATI holds an 85 percent share of the market for Integrated HDTV Digital Cable Ready (DCR) and DTV off-air VSB demodulators. In short, ATI has the most fielded VSB receiver chips, in the largest variety of consumer branded equipment, of any chip supplier in the world.

As such, ATI is uniquely positioned to comment on DTV receiver technology.[3] ATI therefore offers the following:

(1) The Commission should adopt the cross-industry receiver performance guidelines set forth in ATSC's "A/74 Recommended Practice;"

(2) The performance measurement factors known as A/74 Field Ensemble testing indicate actual receiver performance more accurately than do the A/74 Laboratory Ensembles and in fact provide the most reliable and accurate method of evaluating DTV receiver performance;

---

2 Launched in January 1985, the NASDAQ-100 Index represents the largest non-financial domestic and international issues listed on The NASDAQ Stock Market based on market capitalization. *See* http://dynamic.nasdaq.com/dynamic/nasdaq100_activity.stm

3 Attachment A diagrams the components of a typical DTV receiver.

(3) The current DTV receiver marketplace offers end-users superior performance that is highly affordable, and market trends project increasing affordability and performance as equipment manufacturers integrate the latest generations of DTV receiver chips; and

(4) Neither price nor brand name indicate to consumers the performance of DTV receivers and using the best chips does not necessarily cost more. As a result, consumers lack sufficient information for purchasing products based on DTV receiver performance.

I. The ATSC "A/74 Recommended Practice: Receiver Performance Guidelines" Best Characterizes DTV Receiver Performance.

A. The A/74 Receiver Performance Guidelines Provide an Appropriate Set of DTV Receiver Performance Benchmarks.

The *NOI* seeks comment on the appropriate parameters for testing the performance of DTV receivers and the interference rejection capability of these receivers.[4] ATI recommends that the Commission in this proceeding adopt the "A/74 Recommended Practice: Receiver Performance Guidelines" as published by the Advanced Television Systems Committee, Inc. ("ATSC").[5] In 2003, the Commission requested ATSC's assistance in developing standards for DTV receiver performance.[6] The Commission specifically suggested an approach whereby "industry parties representing broadcasters, consumer electronics manufacturers, consumers, and others as appropriate, would identify the relevant DTV receiver performance parameters,

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4 *NOI* at ¶ 17.

5 As the Commission is aware, ATSC is a cross-industry association comprised of approximately 140 member companies and organizations that participate in developing Standards and Recommended Practices for the DTV industry.

6 *Notice of Inquiry* in ET Docket No. 03-65; MM Docket No. 00-39, *Interference Immunity Performance Specifications for Radio Receivers; Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, March 2003.

develop appropriate minimum performance specifications for those parameters, and publish them."[7]

In response, ATSC formed the Specialist Group on Receivers, commonly known as T3/S10, comprised of representatives from across the range of industries and parties interested in DTV receiver performance. ATSC established this group specifically to develop performance guidelines and recommendations suited to represent accurately the demands of all interested parties. Working together, this cross-industry effort reached consensus on DTV receiver performance guidelines and created the "A/74 Recommended Practice." ATI recommends that the Commission adopt the "A/74 Recommend Practice" because it reflects this cross-industry agreement and provides the most appropriate and accepted parameters for evaluating receiver performance.

B. A/74 Field Ensemble Testing is the Best Available Indicator of Actual Receiver Performance.

The A/74 Recommended Practice identifies two groups of performance vectors known as Laboratory Ensembles[8] and Field Ensembles.[9] ATI has found that testing to the A/74's Laboratory Ensembles assists in demodulator characterization. Nevertheless, Laboratory Ensembles do not provide an adequate prediction of how well a receiver will perform in the field. In ATI's experience, demodulators optimized for performance on these Laboratory Ensembles often suffer from degraded performance.

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7 *Id.* at ¶¶ 34-36.

8 A/74 Recommended Practice, Section 4.5.3.

9 A/74 Recommended Practice, Section 4.5.2. Sections 4.1 through 4.4 of the A/74 Recommended Practice also include RF measurement and pass/fail thresholds for receiver RF parameters. ATI also has found that receivers that do not reach these thresholds are unlikely to deliver a satisfactory end-user experience.

On the other hand, in ATI's extensive experience, the fifty performance vectors known as Field Ensembles provide a comparatively better indicator of actual receiver performance than do Laboratory Ensembles. As described below, the A/74 Field Ensembles in fact provide the best available indicator of actual receiver performance. As such, A/74 Field Ensembles best satisfy the Commission's need for guidelines to evaluate DTV receiver performance accurately.

While the A/74 Field Ensembles identify the parameters for evaluating DTV receiver performance, they do not specify a detailed test procedure or grading system with which to evaluate a receiver's performance quantitatively. ATI, in cooperation with its customers in all affected industries, developed a robust test procedure and grading system based on the A/74 Field Ensembles. Attachment B details this procedure. Applying this procedure in conjunction with the A/74 Field Ensembles, ATI conducted performance tests on VSB demodulator chips used in two high performing and two lower performing HDTV sets and STBs available at retail today. The VSB chips included in these DTV receivers incorporated "state of the art" technology as of 2003 and 2004. Figure 1 below indicates the results of ATI's Field Ensemble tests on these four receivers.

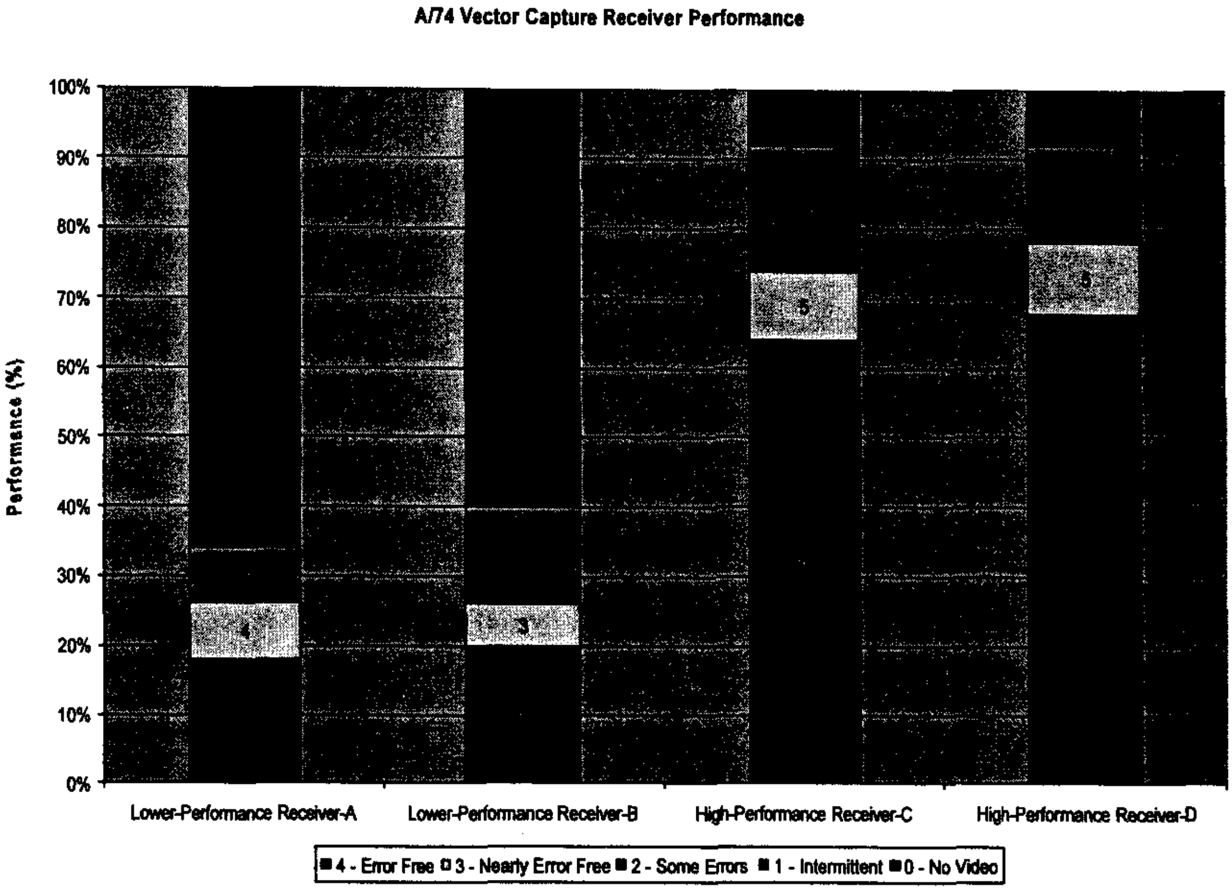

Figure 1

As shown in Figure 1, Receivers C and D clearly demonstrate superior performance on the A/74 Field Ensemble testing. All comprehensive independent field testing known to ATI also confirms that A/74 Field Ensemble is the best available indicator of actual DTV receiver performance. Likewise, ATI's own independent field testing and analysis verifies that receivers such as Receivers C and D that show superior performance on the A/74 Field Ensembles tend to perform better in the field. In addition, ATI's customers also report that Receiver D (the highest-performance receiver based on A/74 Field Ensemble tests) outperforms all other DTV receivers available today in their own (proprietary) independent field tests. Indeed, VSB demodulators of the type included in Receiver D are the best-selling demodulators on the market.[10] Consequently, ATI's own field tests, independent field tests conducted by DTV manufacturers, and the marketplace itself therefore confirm A/74 Field Ensemble-based testing and grading procedures as the best currently available indicator of DTV receiver performance. Because A/74 Field Ensemble testing provides the best available information regarding the relative performance of DTV receivers and demodulators, the Commission should endorse Field Ensemble testing as developed by ATSC in the cross-industry A/74 Recommended Practice.

II. Equipment Available in All Price Ranges Provides Exceptional DTV Receiver Performance, and Differences In Receiver Performance Do Not Appreciably Affect the Price of Equipment to the End-User.

The *NOI* also requested comment on whether a wide variation in the performance of reasonably priced DTV receivers exists, whether increases in the price of DTV sets correlate with improvements in receiver performance, and whether consumers are aware of the performance differences between DTV receivers such that they can take these differences into account when purchasing DTV equipment.[11] Based on ATI's expertise and extensive experience in the DTV industry, ATI concludes that (1) exceptional DTV receiver performance is available in all price ranges; (2) the use of the highest quality receiver chipsets does not appreciably affect the cost to the end-user of such equipment; and (3) consumers lack sufficient information for purchasing products based on receiver performance.

---

10 DTV manufacturers may require up to twelve months or more to develop a new product and deliver that product to market. Thus, even though the vast majority of ATI's customers adopted the more advanced technology found in Receiver D in the second half of 2004, consumer products containing this improved technology are only now beginning to be shipped to market. ATI's research also indicates that some manufacturers are still introducing new DTV receivers incorporating lower performing VSB technology. These receivers continue to perform at a level roughly equivalent to that of Receivers A and B in Figure 1.

The VSB technology used in a DTV receiver substantially impacts the performance of that receiver. As VSB technology continues to advance, the price of high-performing VSB demodulators decreases, and consequently, the end-user pays the same or less for relatively higher performing DTV equipment than previously available. As Chart A demonstrates, the price differences to equipment manufacturers between higher performing and lower performing VSB demodulator technology continually diminishes and may well disappear in the near term.

VSB RF to Bits Price to CE Manufacturers (Million Units)

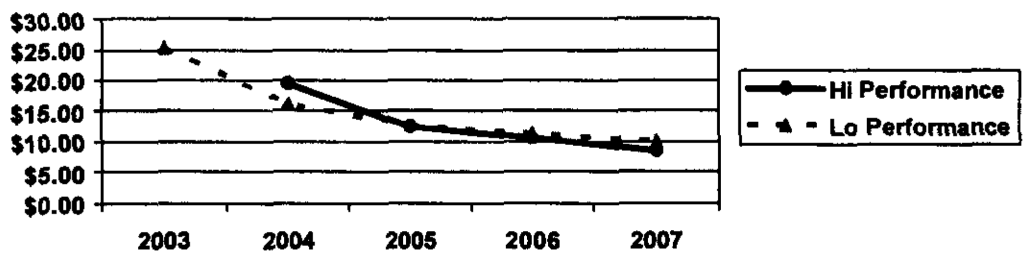

Chart A[12]

In 2004, the price difference between a higher performing and lower performing VSB demodulator was approximately $3.30. Currently, the prices are nearly identical. Based on historical price reductions and anticipated manufacturing volumes, ATI projects that high performance VSB demodulators will be available in 2006 for less than the price today for lower performance VSB demodulators.

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11 See *NOI* at ¶ 17.

12 Chart A includes the price of the Tuner/IF and demodulator functions in high volumes (>250K). It excludes the cost of license fees paid by receiver manufacturers.

Current DTV receivers demonstrate this increased performance across a wide range of reception conditions, including less than ideal conditions, as a result of advances in the embedded VSB demodulator chips. Interference rejection capabilities have shown great increases, and prices for units with these capabilities have fallen.

In short, the performance of reasonably priced DTV receivers has drastically improved in recent years as manufacturers have transitioned to the newest VSB demodulator technology. ATI anticipates that this trend will continue, as improved performance becomes increasingly affordable. Even low priced DTV sets and receivers today often have excellent reception capabilities, and, soon, all DTV sets and receivers should perform at least as well as the most advanced equipment available today.

Consumers cannot purchase DTV sets based on receiver performance because consumers do not have ready access to information specifying the quality of the chips inside the DTV sets. Even ATI is unable to predict receiver performance of end-user products because ATI cannot determine which chips are embedded in which units based on the material available at retail outlets. After ATI sells demodulator and/or processor chips to its customers, those customers manufacture DTV sets with these chips and re-sell the finished products to wholesalers, retailers, or end-user customers without reporting back to ATI or disclosing to end-users which products include which chips. Brand names do not convey to consumers the quality of embedded chips, as the same manufacturer may use VSB demodulator chips from different suppliers in units offered under the same brand name. Indeed, field tests have shown that even some lower priced DTV receivers outperform higher priced DTV receivers produced by the same manufacturer due to the use of different VSB demodulator chips in the tested equipment that are not readily apparent to end-users.

Because neither price nor brand name is predictive of performance, consumers consequently lack sufficient information for purchasing products based on the likely performance level of DTV receivers.

CONCLUSION

ATI recommends that the Commission utilize the ATSC's A/74 Field Ensembles as appropriate parameters for testing the performance of DTV receivers. ATI's own analysis and independent field tests demonstrate that the A/74 Field Ensembles are the best available indicator of actual receiver performance.

As a market leader in the design and production of DTV receiver chips, ATI also submits that superior DTV receiver performance is available to consumers in equipment in all price ranges. As equipment manufacturers have transitioned to the newest generations of receiver chip technology, DTV sets with greatly improved performance are increasingly available at lower prices. The trends of increases in performance and affordability with simultaneous decreases in its costs will continue, leading to more widespread availability of affordable DTV equipment capable of excellent reception in even adverse conditions.

Respectfully submitted,
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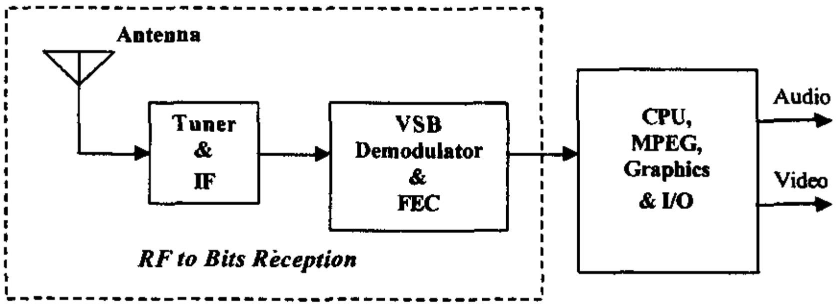
Dated: June 17, 2005

ATTACHMENT A

A typical DTV receiver is comprised of four primary elements: the antenna, the Tuner/IF, the Demodulation/FEC (referred to commonly as the demodulator), and the CPU/MPEG Processor. ATI sells the demodulator under the NXT and THEATER brand names and the CPU/MPEG/Graphics/I/O Processor under the XILLEON brand. Some of ATI's XILLEON devices include THEATER technology. Tuners and antennas are available from various vendors.



ATTACHMENT B

ATI Research Inc.
White Paper
Recommended Testing Procedure for the Evaluation of ATSC A/74 Vector Capture VSB Receiver Performance
June 2005

Introduction. **ATSC A/74, 18 June 2004, Recommended Practice: Receiver Performance Guidelines [1],** recommends 50 RF vector captures or field ensembles which can be used in the evaluation of DTV receiver performance. In order to properly characterize receiver performance against these 50 vector captures, a method was developed that standardizes the testing procedure. The evaluation of the receiver performance with any vector capture is subjective. [illegible]oal of this white paper is to document a standard testing procedure that creates co[illegible]t receiver performance results. This procedure can be used in the receiver evalu[illegible]f any RF vector capture data set and not specifically ATSC A/74 ve[illegible]tures.

Vector Captures. The best metric [illegible]eceiver performance is r[illegible]ld field testing. Although laboratory testing with [illegible] scenarios has some me[illegible]ite field testing is the absolute final measure of [illegible]eiver [illegible]mance. Subjecting mult[illegible]vers to different locations around the[illegible]ntry and [illegible]hanging environments [illegible] reliably determine ranking of receiver p[illegible]formance an[illegible]age. Unfortunately this can be an expensive time consuming process with the exact [illegible] conditions varying over time. If a snap-shot of the RF signal could be taken, then the[illegible]que signal conditions could be repeated in a lab environment any time on any receiver. [illegible] the exact purpose of RF vector capture te[illegible]

A/74 Vector Cap[illegible] [illegible]ctor captures cited in A/74 Annex A are indoor and outdoor field ensem[illegible]es from [illegible]York City and Washington, D.C. area. The A/74 Annex A, vector capt[illegible]es are ap[illegible]seconds in length. The capture details and format are describ[illegible] in r[illegible]ence [1]. [illegible]all the quality of these RF vector captures is good, but 9 of the 50 [illegible]rs have dropp[illegible] samples and 3 of the 50 vectors have gray-screen video. Extreme ca[illegible] is needed in the evaluation of these particular vector captures.

RF Playback Equipment. [illegible] Sencore RFP910 or compatible RF playback device is required for real-time playba[illegible]nd receiver evaluation of the vector captures. In addition to a 44 MHz output[illegible]he RFP910 can provide an RF output on terrestrial channels 2 through 69. The RFP910 has the capability of continually looping the vector captures which allows multiple evaluations of the same vector capture to measure subtle performance differences When using the RFP910, it is recommended to allow several loopings (i.e. at least 3 loopings) of the vector capture before any performance measurements are recorded to ensure stability of the playback device.

Vector Capture Performance Criteria. Each vector capture is looped on the Sencore RFP910 and a 5-grade performance metric is assessed for each receiver. The vector capture is looped at least 3 times before any reception grade is assessed. Each receiver is then evaluated over a number of vector capture loops. Very often a vector capture exhibits slightly different performance grades. In this case, the higher grade score is assessed. If dramatically different grades are observed on each loop, then the lower grade is recorded. To help evaluate closely performing receivers, notes can be added to help assess some of the lower grades.

A pictorial representation of the receiver video performance criteria is shown in Figure 1.

Figure 1. Receiver Video Performance Criteria

The following five performance grades are applied to a receiver per vector capture:

4 – Error Free. The receiver does not exhibit any visible reception problems. Note that errors may occur in the video but some of these errors can be virtually unseen by the observer due to MPEG decoder error concealment. Careful observation is required to identify these visual errors. Audio content can be used to identify reception issues. The home viewer would not notice reception issues.

3 – Mostly Error Free. The receiver is near perfect except for up to two visible video defects or events over the 24 second loop period. Note that depending on the quality of the MPEG decoder, error concealment versus receiver performance should be differentiated. With this grade, the home viewer would most likely continue watching the program but with noticeable occasional reception issues.

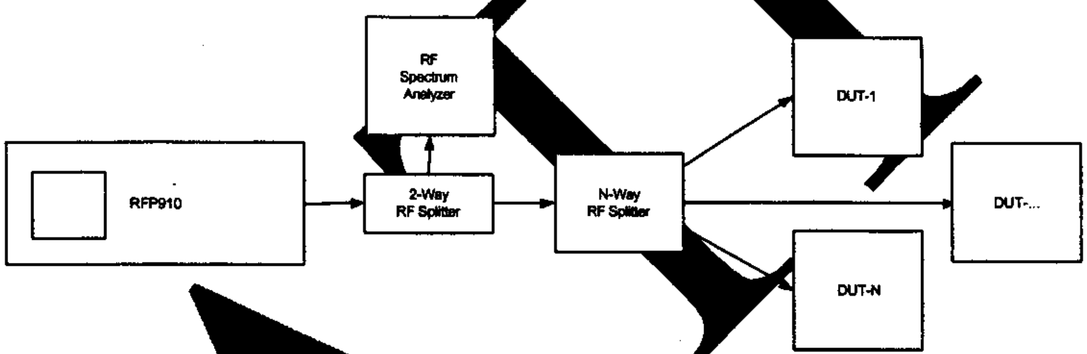
2 – Some Errors. The receiver exhibits some errors, but more than ½ of the video is error free. The receiver has marginal reception for this vector capture. With this grade, although very annoying, the home viewer may watch a high demand content such as a World Cup soccer match.

1 – Many Errors. The receiver exhibit many errors, with less than ½ of the video as error free. The receiver has marginal reception on the vector capture. With this grade, the content is marginally watch-able to totally un-watch-able by a viewer.

0 – Little or No Video. The receiver exhibits constant errors, with 0% clear error-free video or no video. The receiver essentially has no reception. With this grade, the content is unwatchable by a home viewer.

<u>Test Procedure.</u> The following is a step-by-step procedure for testing the vector captures. A block diagram of the test setup is shown in Figure 2.

Figure 2. Vector Capture Test Set-up



1) Load a clean reference vector [illegible] a RFP910 such as Hawaii_ReferenceA provided with the RFP910.

2) Set the RFP910 to Channel 26 (545 MHz).

3) Set the RFP910 is setup to playback at 21.52 MS/s

4) Set the RFP910 to max power output.

5) Using an RF-splitter, equally split the RF signal from the RFP910 to the multiple devices under test (DUTs). It is recommended that an RF spectrum analyzer be connected to one of the split outputs to monitor the signal during playback.

6) Tune the DUTs and ensure reception of the clean test signal. All the DUTs should score a "4 – Error Free" on this reference vector capture.

7) Load and play any of the A/74 vector captures on RFP910.

8) Ensure the DUTs are properly tuned to Physical Channel 26. Some receivers may have problems with the switch of content from one vector to another. In this case, a channel re-scan or re-tune may be required. Careful effort is required to ensure that "no-video" on a DUT is due to a reception issue and not a program identification issue.

9) Allow at least 3 loops of the vector capture on the RFP910.

10) Evaluate all the DUTs over multiple loops of the RFP910 until a consistent and repeatable score can be determined. This may take a couple of loops for obvious grade scores to many loops and careful evaluation for non-obvious grade scores. If multiple DUTs have identical scores for the same vector capture, but there is a clear difference in performance, then this should be noted in the comments for the test.

11) The vector capture should be scored per DUT according to the guidelines discussed above.

12) Steps 7 through 11 should be repeated for all vector captures of interest.

<u>A/74 Vector Capture Limitations</u>: 9 of the 50 A/74 field ensemble vector captures have physical defects in the original data collections. This is a known issue and great care is needed to separate "real" receiver reception problems versus "non-real" problems caused from the physical defects of the vector captures. Additionally, the vector capture looping on the RFP910 causes a non-real event on the transition from the end of the video file to the start of the video file. This is a limitation of this type of evaluation method. These non-real events are ignored for this evaluation process.

The following A/74 vectors have 48 dropped samples:
Vector Capture 32 of 50, WAS-[illegible]/34/01 Indoor @ 14.9905 sec
Vector Capture 33 of 50, WAS-[illegible] Outdoor @ 15.07375 sec
Vector Capture 34 of 50, WAS-[illegible]8/36/[illegible] @ 22.2029 sec
Vector Capture 35 of 50, WAS-047/48/01 [illegible]oor @ 13.773 sec
Vector Capture 36 of 50, WAS-049/34/01 Indoor possible dropped symbol not specified
Vector Capture 37 of 50, WAS-049/39/01 Indoor @ 24.855 sec
Vector Capture 46 of 50, WAS-082/35/01 Indoor @17.1644 sec
Vector Capture 47 of 50, WAS-0[illegible]3/36/01 Indoor @ 14.8805 sec
Vector Capture 48 of 50, WAS-083/39/01 Indoor @ 12.1696 sec

3 of the 50 vectors have a gray, white or blank video content. Determining receiver performance on these vectors can be difficult if internal receiver metrics can not be accessed. If internal metrics indicate no reception issues for these blank-content vector captures, then these vector captures are not included in the performance estimation.

The following A/74 vectors have no content video (gray, white or black screen):
Vector Capture 22 of 50, WAS-003/35/01 Outdoor
Vector Capture 24 of 50, WAS-311/35/01 Outdoor

Vector Capture 44 of 50, WAS-080/35/01 Indoor

Conclusion. The A/74 vector captures are an excellent tool for determination of receiver reception performance in the field. Careful evaluation and testing procedure of the vector captures is required to ensure consistent receiver performance results.

References. [1] **ATSC Recommended Practice: Receiver Performance Guidelines,** Doc. A/74, 18 June 2004, (www.atsc.org/standards/a_74.pdf).

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Technical Standards for Determining Eligibility	)	
For Satellite-Delivered Network Signals Pursuant	)	ET Docket No. 05-182
To the Satellite Home Viewer Extension and	)	
Reauthorization Act		

To: The Commission

COMMENTS OF THE
CONSUMER ELECTRONICS ASSOCIATION

The Consumer Electronics Association ("CEA"), respectfully files these Comments in response to the Commission's Notice of Inquiry ("NOI") in the above-captioned proceeding.[1] CEA does not at this time wish to recommend specific rules changes related to determining whether a household is unserved by a DTV signal. However, CEA appreciates the FCC's consideration of this important subject and makes the following general comments.

It is beneficial to consumers, broadcasters, and direct broadcast satellite (DBS) service providers to make the determination of whether a household is unserved by an adequate digital TV signal as simple and consistent as possible. The goal of this proceeding should be to find an agreeable method of making this determination that relies first on prediction or modeling and does not require in-situ field testing. To that end, CEA is supportive of the FCC's current reliance on the modified Longley-Rice model for evaluating the field strength of a particular DTV station at a specific location.

Whatever the result of this inquiry, it is imperative that the FCC have a single, consistent definition of the service area for each analog and digital TV station. Those definitions today are

[1] *In the Matter of Technical Standards for Determining Eligibility For Satellite-Delivered Network Signals Pursuant To the Satellite Home Viewer Extension and Reauthorization Act*, Notice of Inquiry, ET Docket No. 05-182, FCC 05-94 (rel. May 3, 2005) ("NOI").

the Grade B contour and the DTV noise-limited service contour, respectively. In its Notice of Proposed Rulemaking on Unlicensed Operation in the Broadcast TV Bands[2], the FCC chose to use the Grade B contour as a precise demarcation of which channels should be considered unoccupied for the purpose of allowing unlicensed devices to operate in TV bands. Broadcast television viewers have a right to a consistent definition of whether their household is considered serve by a television station. That definition should not differ based on whether the reason for the question is determining if an unlicensed device can occupy that channel or if a DBS provider can deliver that channel as part of its service. In fact, it is entirely logical that if a station is weak enough to be considered an unoccupied channel, one should expect to receive that station by DBS service. The FCC must be careful not to end up with two regimes such that a household might be told that they can receive a weak local station (based on field measurement) and, therefore, are not eligible to receive that station by satellite and yet that same broadcast channel could be occupied by a nearby unlicensed transmitter (based on Grade B contour) and, therefore, rendered unusable.

Both receivers and the DTV receiving environment are extremely complex. It seems impractical and counterproductive to even attempt to factor in all the options that are available to consumers for determining whether an adequate DTV signal exists. Even if all receivers were found to perform very nearly the same, each installation is entirely different, both in the ambient RF environment and the antenna used to extract energy from that environment. The questions raised by this inquiry, although directed by Congress, can distract from the basic goal. The issue of DTV reception is tremendously complicated in an engineering sense, but the Government's involvement should be limited and specific so as to let the marketplace deliver the best solutions. The FCC should be wary of starting down a path of determining how much effort a consumer should put into broadcast DTV reception.

[2] *In the Matter of Unlicensed Operation in the Broadcast TV Bands*, Notice of Proposed Rulemaking, ET Docket No. 04-186, FCC 04-113 (rel. May 25, 2004) ("NPRM").

Comments on Specific Factors Raised by this Inquiry

The Notice provides six factors that are specified by the Satellite Home Viewer Extension and Reauthorization Act of 2004 (SHVERA)[3] to be considered by the FCC in this inquiry regarding whether rules should be revised for determining if a household is unserved by a DTV station. These factors are repeated here with brief comments as to their relevance for any rule changes.

- whether to account for the fact that an antenna can be mounted on a roof or placed in a home and can be fixed or capable of rotating;

Although antenna type and placement is indeed a critical factor in DTV reception, it is not appropriate for the FCC to consider these details for the rules in question. It is necessary and sufficient for the FCC to state that a given field strength, predicted or measured, at a known height above the location determines whether the household is served.

- whether Section 73.686(d) of title 47, Code of Federal Regulations, should be amended to create different procedures for determining if the requisite digital signal strength is present than for determining if the requisite analog signal strength is present;

The FCC rightfully points out the fundamental differences between analog and digital TV signals and the need for adapting measurement details to the particulars of DTV signals. CEA has not taken a position on the correct intermediate frequency (i.f.) bandwidth or tuning location to use for DTV signal strength measurement.

- whether a standard should be used other than the presence of a signal of a certain strength to ensure that a household can receive a high-quality picture using antennas of reasonable cost and ease of installation;

[3] *The Satellite Home Viewer Extension and Reauthorization Act of 2004*, Pub. L. No. 108-447, § 207, 118 Stat 2809, 3393 (2004) (to be codified at 47 U.S.C. § 325), § 204(b).

Again, CEA believes that determining the presence of a signal of a certain strength is the right level of involvement for the FCC. Going beyond that invites the quagmire of assessing reasonableness, cost effectiveness, and ease of installation.

- whether to develop a predictive methodology for determining whether a household is unserved by an adequate digital signal under section 119(d)(10) of title 17, United States Code;

CEA is supportive of using a predictive methodology for the benefit of all parties involved and to reduce the burden of determining whether a household is unserved. Our own efforts to help consumers select the best antenna for DTV reception[4] indicate that predictive modeling of reception at a given location is a tall challenge. However, the Longley-Rice model is a very good tool with years of engineering development. CEA is not aware of any industry discussion regarding a better model that might be used for the same purpose.

- whether there is a wide variation in the ability of reasonably priced consumer digital television sets to receive over-the-air signals, such that at a given signal strength some may be able to display high-quality pictures while others cannot, whether such variation is related to the price of the television set, and whether such variation should be factored into setting a standard for determining whether a household is unserved by an adequate digital signal;

Within the ATSC's work on A/74, *ATSC Recommended Practice: Receiver Performance Guidelines*, the tradeoffs involved in receiver design have been discussed in some detail among broadcasters and TV manufacturers. In a market guided by competition and not Government intervention, it should be expected to have products that optimize for different parameters. These variations are relatively small, as every

[4] See www.antennaweb.org.

manufacturer is motivated by competition to build good receivers, but these variations still serve the market. A DTV that has relatively poor weak signal reception as compared to every other receiver in the market, might have excellent selectivity and prove to be the ideal receiver for a particular location with closely packed channels. Conversely, suppose the FCC determines that there is very little variation in the ability of existing DTVs to receive over-the-air signals. Those same DTVs when connected to the many available antennas and placed in the infinitely complex RF environment will certainly demonstrate a wide variation in reception capability.

- whether to account for factors such as building loss, external interference sources, or undesired signals from both digital television and analog television stations using either the same or adjacent channels in nearby markets, foliage, and man-made clutter.

Again, CEA asserts that there is only so much that the FCC can factor into its determination of served households. Broadcasters, manufacturers, and retailers are all highly motivated to make broadcast television consumers successful in their quest to receive pristine HDTV signals. And yet, in the fringe areas that are the subject of this inquiry, there is no perfect predictor or guarantee of reception. The FCC should not attempt to account for the listed environmental factors beyond the degree to which they are accounted for today.

Conclusion

For the reasons expressed herein, CEA recommends that the FCC focus its attention on a consistent definition of served households based on field strength at the location, improvement of the Longley-Rice model if needed, and refinement of measurement procedures to accommodate the specific nature of DTV signals. The FCC should not attempt to account for the myriad other factors that make up the DTV receiving system unique to every installation.

Respectfully submitted,

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